

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising
a transfer belt;
at least one process cartridge below the transfer belt, the at least one process cartridge comprising

a rotating image carrier having an image carrier surface,
a brush roller in contact with the image carrier surface,
a charging member either in proximity to or in contact with the image carrier surface, the charging member configured to transfer a charge to the image carrier surface, and
a casing, the casing including a miler in contact with the image carrier surface and arranged to separate the brush roller from the charging member; and an exposure device below the at least one process cartridge.
2. The image forming apparatus of Claim 1, further comprising:
at least one toner container positioned above the transfer belt.
3. The image forming apparatus of Claim 1, the at least one process cartridge further comprising:
a toner container.
4. The image forming apparatus of Claim 1, the miler comprising:
a seat member made of urethane resin.
5. The image forming apparatus of Claim 1, the at least one process cartridge further comprising:
a positive brush charger;
a negative brush charger; and
a controllable switch connecting the positive and negative brush chargers to the brush roller.
6. The image forming apparatus of Claim 5, the brush roller comprising:
a brush density less than 858000 filaments/inch² and more than 12000 filaments/inch².

7. The image forming apparatus of Claim 1, the charging device comprising:
a charging roller.
8. The image forming apparatus of Claim 7, the at least one process cartridge further comprising:
a cleaning brush roller in contact with at least one of the image carrier surface and the charging roller; and
a scraper in contact with the cleaning brush roller.
9. The image forming apparatus of Claim 7, the charging roller comprising:
a film wrapped around both ends of the charging roller so as to create an air-gap between the charging roller and the surface of the rotating image carrier.
10. The image forming apparatus of Claim 1, wherein the brush roller and the rotating image carrier are configured to rotate in the same direction.
11. The image forming apparatus of Claim 1, wherein the brush roller and the rotating image carrier are configured to rotate in opposite directions.
12. The image forming apparatus of Claim 1, further comprising:
a first transfer charging device, interior to the transfer belt and opposite the rotating image carrier.
13. The image forming apparatus of Claim 12, the first transfer charging device comprising:
a first transfer roller.
14. The image forming apparatus of Claim 12, further comprising:
a second transfer charging device, exterior to the transfer belt and arranged downstream from the first transfer charging device and configured to transfer an image from the transfer belt to a transfer medium.
15. The image forming apparatus of Claim 14, the second transfer charging device comprising:
a second transfer roller.

16. The image forming apparatus of Claim 1, further comprising:
a belt cleaning device.

17. The image forming apparatus of Claim 1, the at least one toner container comprising:
toner having an average degree of circularity of 0.93 or more.

18. The image forming apparatus of Claim 2, wherein
the at least one toner container comprises a plurality of toner containers,
the at least one process cartridge comprises a plurality of process cartridges, and
each of the plurality of toner containers, the transfer belt, the plurality of process
cartridges, and the exposure device are inclined along a first horizontal axis.

19. The image forming apparatus of Claim 18, the plurality of process
cartridges comprising:

adjacent first and second process cartridges, wherein the first process cartridge
partially overlaps the second process cartridge along a vertical axis.

20. The image forming apparatus of Claim 19, wherein the first and second
process cartridges are parallel to each other in a second horizontal axis, the second
horizontal axis orthogonal to the first horizontal axis.

21. An image process cartridge, comprising:
a rotating image carrier having an image carrier surface;
a brush roller in contact with the image carrier surface;
a charging member in proximity to or in contact with the image carrier surface,
the charging member configured to transfer a charge to the image carrier surface; and
a casing including a miler in contact with the image carrier surface and arranged
to separate the brush roller from the charging member.

22. The image process cartridge of Claim 21, further comprising:
a toner container.

23. The image process cartridge of Claim 21, the miler comprising:
a seat member made of urethane resin.

24. The image process cartridge of Claim 21, the process cartridge further comprising:

- a positive brush charger;
- a negative brush charger; and

a controllable switch connecting the positive and negative brush chargers to the brush roller.

25. The image process cartridge of Claim 24, the brush roller comprising:

a brush density less than 858000 filaments/inch² and more than 12000 filaments/inch².

26. The image process cartridge of Claim 21, the charging device comprising:

a charging roller.

27. The image process cartridge of Claim 26, the process cartridge further comprising:

a cleaning brush roller in contact with at least one of the image carrier surface and the charging roller; and

a scraper in contact with the cleaning brush roller.

28. The image process cartridge of Claim 26, the charging roller comprising:

a film wrapped around both ends of the charging roller so as to create an air-gap between the charging roller and the surface of the rotating image carrier.

29. The image process cartridge of Claim 21, further comprising:

a developing device.

30. The image process cartridge of Claim 29, the developing device comprising:

a developing roller in contact with the image carrier surface; and

a developing roller power supply connected to the developing roller.

31. The image process cartridge of Claim 21, wherein the brush roller and the rotating image carrier rotate in the same direction.

32. The image process cartridge of Claim 21, wherein the brush roller and the rotating image carrier rotate in opposite directions.

33. A method for applying an image to a transfer medium, comprising:
negatively charging a surface of a rotating image carrier with a charging roller;
exposing the charged surface of the rotating image carrier with light;
applying toner from a developing roller to the exposed, charged surface of the
rotating image carrier via a magnetic field;
transferring toner from the exposed, charged surface of the rotating image carrier
to a transfer belt; and
cleaning positively charged residual toner from the surface of rotating image
carrier with a brush roller charged with negative charge.

34. The method of Claim 33, further comprising:
grounding the charging roller;
cleaning the brush roller by applying a positive charge to the brush roller so that
collected toner is transferred from the brush roller to the surface of rotating image
carrier; and
collecting onto the developing roller the toner transferred from the brush roller.

35. A image transfer apparatus, comprising:
means for negatively charging a surface of a rotating image carrier;
means for exposing the charged surface of the rotating image carrier with light;
means for applying toner to the exposed, charged surface of the rotating image
carrier;
means for transferring toner from the exposed, charged surface of the rotating
image carrier to a transfer belt; and
means for cleaning positively charged residual toner from the surface of rotating
image carrier.

36. The apparatus of Claim 35, further comprising:
means for cleaning toner from the means for cleaning positively charged
residual toner; and
means for collecting the toner cleaned from the means for cleaning positively
charged residual toner.

37. The method of Claim 36, further comprising:
means for transferring an image from the transfer belt to a transfer medium.

38. A computer program product and memory configured to host instructions and parameters corresponding to the steps recited in Claims 33-34.